

CLAIMS

1. A flat panel display apparatus comprising:

a main plate;

5 an organic light emitting element including a first electrode, a second electrode corresponding to the first electrode, and an organic light emitting layer between the first and second electrodes to generate a light based on a current that flows between the first and second electrodes through the organic light emitting layer, the organic light emitting element formed on the main plate;

10 a protecting layer on the organic light emitting element to protect the organic light emitting element; and

an attachable-detachable layer on the protecting layer.

2. The flat panel display apparatus of claim 1, wherein an adhesiveness of
15 the attachable-detachable layer is changed based on a light that is irradiated into the attachable-detachable layer.

3. The flat panel display apparatus of claim 2, wherein the attachable-detachable layer comprises a photoresist.

20 4. The flat panel display apparatus of claim 1, wherein an adhesiveness of the attachable-detachable layer is changed based on a temperature of the attachable-detachable layer.

5. The flat panel display apparatus of claim 4, wherein the attachable-detachable layer comprises an isocyanate, a vinyl acetate, a polyester, a polyvinyl alcohol, an acrylate, an epoxy, a synthetic rubber or a thermoplastic resin.

5 6. The flat panel display apparatus of claim 1, wherein the protecting layer comprises a first protecting portion on the organic light emitting element and a second protecting portion on the first protection portion.

7. The flat panel display apparatus of claim 6, wherein the first protecting
10 portion comprises an organic material, and the second protecting portion comprises an organic material, an inorganic material or a mixture thereof.

8. The flat panel display apparatus of claim 7, wherein the organic material comprises a light curable resin or a thermally curable resin.

15 9. The flat panel display apparatus of claim 1, further comprising an adhesive layer disposed between the organic light emitting element and the protecting layer to combine the protecting layer with the organic light emitting element.

20 10. The flat panel display apparatus of claim 9, wherein the adhesive layer comprises a light curable resin or a thermally curable resin.

11. A flat panel display apparatus comprising:
25 a main plate;

an organic light emitting element including a first electrode, a second electrode corresponding to the first electrode and an organic light emitting layer disposed between the first and second electrodes to generate a light based on a current that flows between the first and second electrodes through the organic light emitting layer,
5 the organic light emitting element formed on the main plate;

a protecting layer on the organic light emitting element to protect the organic light emitting element; and

an auxiliary plate on the protecting layer.

10 12. The flat panel display apparatus of claim 11, further comprising an adhesive layer disposed between the organic light emitting element and the protecting layer to combine the protecting layer with the organic light emitting element.

15 13. The flat panel display apparatus of claim 11, further comprising an auxiliary adhesive layer disposed between the auxiliary plate and the protecting layer to combine the protecting layer with the auxiliary plate.

14. A flat panel display apparatus comprising:

20 a main plate;

an organic light emitting element including a first electrode, a second electrode corresponding to the first electrode and an organic light emitting layer disposed between the first and second electrodes to generate a light based on a current that flows between the first and second electrodes through the organic light emitting layer,
25 the organic light emitting element formed on the main plate;

a composite buffer layer on the organic light emitting element, the composite buffer layer including an organic layer and a plurality of inorganic insulation particles that are in the organic layer; and

5 a protecting layer on the composite buffer layer to protect the organic light emitting element.

15 15. The flat panel display apparatus of claim 14, wherein each of the inorganic insulation particles comprises at least one of silicon carbide, lithium oxide, magnesium oxide, calcium oxide, silicon oxide, silica gel, aluminum oxide, titanium
10 oxide, silicon oxynitride, silicon nitride, aluminum nitride or combinations thereof.

16. The flat panel display apparatus of claim 14, wherein a size of each of the inorganic insulation particles is about 5nm to about 10 μ m.

15 17. The flat panel display apparatus of claim 14, wherein the organic layer comprises at least one of an epoxy resin, a silicone resin, a fluoric resin, an acrylic resin, an urethane resin, a phenolic resin, a polyethylene, a polypropylene, a polystyrene, a polymethyl methacrylate, a polyurea, a polyimide or combinations
thereof.

20 18. The flat panel display apparatus of claim 14, wherein the protecting layer comprises an inorganic protecting layer, an organic protecting layer or a multi-layer having an inorganic protecting portion and an organic protecting portion.

19. The flat panel display apparatus of claim 14, wherein the protecting layer comprises an organic protecting layer having the inorganic insulation particles, and the organic protecting layer is integrally formed with the composite buffer layer.

5 20. A method of manufacturing a flat panel display apparatus, the method comprising:

forming an organic light emitting element having a first electrode, a second electrode corresponding to the first electrode and an organic light emitting layer disposed between the first and second electrodes to generate a light based on a
10 current that flows between the first and second electrodes through the organic light emitting layer on a main plate;

forming an attachable-detachable layer on an auxiliary plate;

forming a protecting layer on the attachable-detachable layer;

combining the organic light emitting element with the protecting layer; and

15 removing the auxiliary plate from the protecting layer using the attachable-detachable layer.

21. The method of claim 20, wherein the organic light emitting element is combined with the protecting layer by:

20 pressing the main plate and the auxiliary plate that corresponds to the main plate between two rollers that rotate in opposite directions to each other; and

irradiating a light between the main plate and the auxiliary plate.

22. The method of claim 20, wherein the organic light emitting element is
25 combined with the protecting layer by:

pressing the main plate and the auxiliary plate that corresponds to the main plate between an upper press and a lower press corresponding to the upper press; and

irradiating a light into the attachable-detachable layer and the protecting layer
5 between the main plate and the auxiliary plate.

23. The method of claim 20, further comprising forming an adhesive layer on the organic light emitting element.

10 24. The method of claim 23, wherein the organic light emitting element is combined with the protecting layer by:

pressing the main plate and the auxiliary plate that corresponds to the main plate between two rollers that rotates in opposite directions to each other; and

irradiating a light into the attachable-detachable layer and the adhesive layer
15 between the main plate and the auxiliary plate.

25. The method of claim 20, wherein the attachable-detachable layer comprises at least one of an isocyanate, a vinyl acetate, a polyester, a polyvinyl alcohol, an acrylate, a synthetic rubber, an epoxy, a thermoplastic resin or
20 combinations thereof.

26. The method of claim 20, wherein the protecting layer is formed by:
forming a second protecting portion on the attachable-detachable layer; and
forming a first protecting portion on the second protecting portion.

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27. The method of claim 26, wherein the first protecting portion comprises an organic material, and the second protecting portion comprises an organic material, an inorganic material or a mixture thereof.

5 28. The method of claim 27, wherein the organic material comprises a light curable resin or a thermally curable resin.

29. A method of manufacturing a flat panel display apparatus, the method comprising:

10 forming an organic light emitting element having a first electrode, a second electrode corresponding to the first electrode and an organic light emitting layer disposed between the first and second electrodes to generate a light based on a current that flows between the first and second electrodes through the organic light emitting layer on a main plate;

15 forming a protecting layer on an auxiliary plate; and
combining the organic light emitting element with the protecting layer.

30. The method of claim 29, further comprising forming an adhesive layer on the organic light emitting element.

20 31. The method of claim 29, further comprising forming an auxiliary adhesive layer between the auxiliary plate and the protecting layer.

25 32. A method of manufacturing a flat panel display apparatus, the method comprising:

forming an organic light emitting element having a first electrode, a second electrode corresponding to the first electrode and an organic light emitting layer disposed between the first and second electrodes to generate a light based on a current that flows between the first and second electrodes through the organic light emitting layer on a main plate;

forming a composite buffer layer on the organic light emitting element, the composite buffer layer including an organic layer and a plurality of inorganic insulation particles in the organic layer; and

forming a protecting layer on the composite buffer layer to protect the organic light emitting element.

33. The method of claim 32, wherein the composite buffer layer is formed by:

mixing a material that forms the organic layer with the inorganic insulation particles;

heating the mixture of the material that forms the organic layer and the inorganic insulation particles; and

coating the heated mixture on the organic light emitting element.